

(Twice Amended) 1. An integrated multiple-substrate-on-chip-module (MSOCM) assembly comprising:

a chip-size package (CSP)-ready MSOCM board having a top surface and a bottom surface, said CSP-ready MSOCM board includes a plurality of board bonding-wire windows opened in said MSOCM board and said CSP-ready MSOCM board further includes a plurality of board-bonding-pads disposed on said top surface of said CSP-ready MSOCM board near said bonding-wire window;

an adhesive layer disposed beneath said CSP-ready MSOCM board also having a plurality of adhesive-layer bonding wire windows corresponding to and aligned with said board bonding wire windows on said MSOCM board;

B1 a plurality of integrated circuit (IC) chips mounted onto said adhesive layer under said bottom surface of said CSP-ready MSOCM board with each of said IC chips provided with a plurality of chip bonding pads facing an open space defined by said board bonding-wire windows;

a plurality of bonding wires disposed in said space defined by said board bonding-wire windows and adhesive-layer bonding-wire windows and interconnected between each of said chip bonding pads and a corresponding board bonding pad disposed on said top surface of said CSP-ready MSOCM board; and

a CSP-ready land-grid array comprising a plurality of land-[grind] grid contact pads disposed on said top surface of said CSP-ready MSOCM board wherein said plurality of land-grid contact pads are arranged to have a standard CSP-footprint of said IC chips whereby each of said IC chips mounted onto said CSP-ready MSOCM board is provided to be separated into an individual CSP package.

(Twice Amended) 2. The MSOCM assembly of claim 1 wherein:

said CSP-ready MSOCM board and said adhesive layer further include a plurality CSP-ready separation lines dividing each said IC chips mounted onto said bottom surface of said CSP-ready MSOCM board for separating said MSOCM assembly into a plurality of standard individual CSP packages each contain one of said IC chips each having said plurality of land-grid contact pads ready to form a CSP package.

(Twice Amended) 3. The MSOCM assembly of claim 1 wherein:

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said CSP-ready MSOCM board further includes a plurality of via connectors penetrating said CSP-ready MSOCM board and in electrical connection with a plurality of said chip bonding pads via metal traces disposed on said bottom surface of said MSOCM board; and

each of said via connectors further [being in electric connection with] connected to one of said land grid contact pads disposed on said top surface of said MSOCM board.

(Twice Amended) 4. The MSOCM assembly of claim 1 wherein:

said land grid array comprising said plurality of land grid contact pads constituting CSP-ready solder pads disposed on said top surface of said MSOCM board are insulated by a plurality of solder masks disposed between said land grid contact pads.

(Twice Amended) 5. The MSOCM assembly of claim 1 further comprising:

a plurality of solder balls, each mounted on one of said land grid contact pads disposed on said top surface of said CSP-ready MSOCM board.

(Twice Amended) 6. The MSOCM assembly of claim 1 further comprising:

a plurality of testing pins including a set of burn-in test pins and a set of board level test pins disposed on an edge of said CSP-ready MSOCM board and connected to said IC chips provided for conducting a plurality of burn-in and board level tests.

(Amended) 7. The MSOCM assembly of claim 1 wherein:

each of said board bonding-wire windows opened in said CSP-ready MSOCM board above each of said IC chips further comprising a bigger opening near said top surface of said CSP-ready MSOCM board wherein an interface between said bigger opening and a smaller opening at a bottom portion of said board bonding-wire window providing a platform for disposing said board bonding-pads thereon.

(Amended) 8. The MSOCM assembly of claim 1 further comprising:

a liquid encapsulation filler filling each of said board bonding-wire windows; and

each of said board bonding-wire windows further comprising a liquid encapsulation dam disposed on said top surface of said CSP-ready MSOCM board surrounding each of said board bonding-wire [window] windows for keeping said liquid encapsulation filler from flowing outside of said liquid encapsulation dam.

(Amended) 9. The MSOCM assembly of claim 1 wherein:

said CSP-ready MSOCM board [is] comprising a metal core CSP-ready MSOCM board.

(Amended) 10. The MSOCM assembly of claim 1 wherein:

said CSP-ready MSOCM board [is] comprising a laminated multiple-layered board; and

said CSP-ready MSOCM board further having a plurality of built-in passive circuit elements supported on said CSP-ready MSOCM board.

(Amended) 11. A chip-size package (CSP)-ready multiple substrate-on-chip module (MSOCM) board comprising:

a top surface and a bottom surface;

B1 a plurality of bonding-wire windows opened in said CSP-ready MSOCM board with a plurality of board-bonding pads disposed on said top surface surrounding each of said bonding wire windows;

a CSP-ready land-grid array comprising a plurality of land-grind contact pads disposed on said top surface of said CSP-ready MSOCM board wherein said plurality of land-grid contact pads are arranged to have a standard CSP-footprint for packaging IC chips provided to mount onto said CSP-ready MSOCM whereby each of said IC chips when mounted onto said CSP-ready MSOCM board is provided to be separated into an individual CSP package having said standard CSP footprint.

(Amended) 12. The CSP-ready MSOCM board of claim 11 further comprising:

a plurality CSP-ready separation lines for separating said CSP-ready MSOCM board [when mounted] with said IC chips into a plurality of standard individual CSP packages each contain one of said IC chips.

(Amended) 13. The CSP-ready MSOCM board of claim 11 further comprising:

a plurality of via connectors penetrating said CSP-ready MSOCM board and in electrical connection with each of said IC chips via metal traces disposed on said bottom surface of said MSOCM board; and

each of said via connectors further [being in electric connection] connected with one of said land grid contact pads disposed on said top surface of said CSP-ready MSOCM board.

B1 (Amended) 14. The CSP-ready MSOCM board of claim 11 wherein:

[said land grid array comprising said plurality of land grid contact pads constituting CSP-ready solder pads are insulated by] a plurality of solder masks, each disposed between said land grid contact pads for providing insulation between said land grid contact pads.

(Amended) 15. The CSP-ready MSOCM board of claim 11 further comprising:

a plurality of solder balls, each mounted on top of one of said land grid contact pads disposed on said top surface of said CSP-ready MSOCM board.

(Amended) 16. The CSP-ready MSOCM board of claim 11 further comprising:

a plurality of testing pins including a set of burn-in test pins and a set of board level test pins disposed on an edge of said CSP-ready MSOCM board and connected to said IC chips [provided] for conducting a plurality of burn-in and board level tests.

(Amended) 17. The CSP-ready MSOCM board of claim 11 wherein:

each of said board bonding-wire windows further comprising a bigger opening near said top surface of said CSP-ready MSOCM board wherein an interface between said bigger opening and a smaller opening at a bottom portion of said board bonding-wire [window providing] windows defining a platform for disposing said board bonding-pads thereon.

(Amended) 18. The CSP-ready MSOCM board of claim 11 further comprising:

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a liquid encapsulation filler filling each of said board bonding-wire windows; and

each of said board bonding-wire windows further comprising a liquid encapsulation dam disposed on said top surface of said CSP-ready MSOCM board surrounding said board bonding-wire window for keeping said liquid encapsulation filler [from flowing outside of said liquid encapsulation dam] in said board bonding-wire windows.

(Amended) 19. The CSP-ready MSOCM board of claim 11 wherein:

said CSP-ready MSOCM board [is] comprising a metal core CSP-ready MSOCM board.

(Amended) 20. The CSP-ready MSOCM board of claim 11 wherein:

said CSP-ready MSOCM board [is] comprising a laminated multiple-layered board; and

a plurality of built-in passive circuit elements supported on said CSP-ready MSOCM board.

(Amended) 21. A chip-size package (CSP)-ready multiple substrate-on-chip module (MSOCM) board, having a top surface and bottom surface, comprising:

a plurality of bonding-wire windows opened in said CSP-ready MSOCN board with a plurality of board-boarding pads disposed on said top surface surrounding each of said bonding wire windows;

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a plurality of CSP-ready contact pads disposed on said top surface of said CSP-ready MSOCM board wherein said plurality of contact pads are arranged to have a standard CSP-footprint for packaging IC chips provided to mount onto said CSP-ready MSOCM board whereby each of said IC chips when mounted onto said CSP-ready MSOCM board is provided to be separated into an individual CSP package having said standard CSP footprint.
